

MEADOW VOLE (*MICROTUS PENNSYLVANICUS*) FROM THE QUATERNARY OF FLORIDA

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The meadow vole, *Microtus pennsylvanicus* (Ord, 1815) is presently found as far south as Athens, Clarke County, Georgia (Odum, 1948). There is no record of its having occurred farther south within historic time (Audubon and Bachman, 1846; Bangs, 1898). The recent discovery, of fossil remains of this vole in Florida some 300 miles south of its present range is therefore of considerable zoogeographic interest. Previously, *M. pennsylvanicus* has been reported from deposits of Illinoian, Sangamon and Wisconsin age in the great Plains as far south as northern Oklahoma (Hibbard and Taylor, 1960; Stephens, 1960), more than 250 miles south of the present southern limits of the species in that longitude.

The deposit in which the material was found is near Williston, Levy County, Florida (SE $\frac{1}{4}$, S26, T 12S, R 18E), in a water-filled limestone collapse sinkhole locally known as The Devil's Den. The specimens were collected in a rich, stratified bone bed approximately 30 feet under water. Accurate dating is at present impossible, but studies in progress of the deposit as a whole (by H. K. Brooks, John M. Goggin, and Clayton E. Ray) suggest a late Pleistocene or early Recent age.

The material upon which the identification is based consists of an isolated right M³, UF 3918¹ (Figure 1A), and a partial left mandible containing M₁ and M₂, UF 3917 (Figure 1C). In addition there are several isolated incisors which may belong to this species, but are not sufficiently diagnostic to be separated from several other small rodents that occur in the deposit. Identifications were made by comparison with a series of 8 modern *M. p. pennsylvanicus* from the vicinity of Athens, Georgia, the southern extremity of the modern range of the species. I express my appreciation to Mr. Clayton E. Ray, Florida State Museum, for permission to study the fossils, to Dr. Frank Golley of the University of Georgia for making available the comparative series, and to Miss Esther Coogle for illustrating the tooth patterns.

¹The abbreviations UF and UG refer to the University of Florida and University of Georgia Collections.



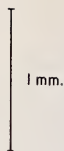
A

UF 3918



B

UG 140



C

UF 3917



D

UG 139

Figure 1.

- A. UF 3918 *Microtus pennsylvanicus*, fossil right M^3
B. UG 140 *M. pennsylvanicus*, recent right M^3
C. UF 3917 *M. pennsylvanicus*, fossil left M_1 and M_2
D. UG 139 *M. pennsylvanicus*, recent left M_1 and M_2

The occlusal surface of the isolated M^3 has a length of 2.3 mm. Measurements of the M^3 in the series of modern specimens are as follows: range, 1.8 mm.-2.6 mm.; average, 2.3 mm. The M^3 of many microtine rodents is one of the more variable teeth in the check series (Howell, 1924; Goin, 1943). The occlusal pattern of the fossil M^3 lies close to the center of the spectrum of variation presented by the specimens examined. Following the anterior loop there are 4 well defined alternating triangles, the first three of which are closed, the fourth opening into the posterior loop. The posterior loop possesses an anteriorly directed loop on the lingual side.

The occlusal length of the fossil M_1 - M_2 is approximately 5.0 mm. (the anterior loop of M_1 is chipped along the anterior border so that exact measurement is impossible). The comparative series measured ranges from 4.3mm.-5.1 mm., averaging 4.7 mm. The dentary is too fragmentary to warrant osteological description.

The occlusal pattern of the fossil M_1 consists of 6 completely closed alternating triangles and a seventh confluent with the anterior loop. The length is approximately 3.1 mm. The length of M_1 in the comparative series averages 3.1 mm., ranging from 2.9 mm.-3.4 mm. Bailey (1900) characterized *M. pennsylvanicus* as possessing 5 alternating triangles and an anterior trefoil, however specimens examined show that the appearance of both 5 and 6 triangles is common, and occasionally a specimen with but 4 triangles and an anterior cinquefoil is encountered. Goin (op. cit.) has previously dealt with the high degree of variation occurring in the teeth of *M. p. pennsylvanicus*. Earlier, Howell (op. cit.), referring to *M. montanus yosemite*, stated that: "It is in the anterior tripartite enamel space that this variation is well nigh infinite. Truly no two are alike, nor is there bilateral symmetry between the two rami in this respect, for as often as not each ramus must be assigned to a different group. If it is attempted to establish too many groups for the different types of variants, however, a condition bordering on chaos results, with weakly defined criteria for designation, . . .". His words should be carefully considered by workers dealing with this group of rodents. Guilday and Bender (1960) comment similarly on this condition in *M. xanthognathus*.

The occlusal pattern of the fossil M_2 consists of a posterior loop and two large lingual and 2 smaller labial triangles, as is characteristic for the species.

For comparative purposes two specimens (right M^3 , UG 140, and left M_1 and M_2 , UG 139) from the southern limits of the present range of the species are illustrated (Figures 1B and 1D).

The fossil teeth may be distinguished from those of closely related microtine rodents by the following criteria. All 3 species of *Pitymys* from North America (*pinetorum*, *parvulus*, and *quasiater*) as well as *Microtus (Pedomys) ochrogaster* and *ludovicianus* have a less complex M_3 , with but 2 alternating triangles (many specimens have none or only 1). The fossil has 3 alternating triangles on the M^3 . The fossil has 6 alternating triangles on M_1 , whereas the mentioned species have 3 such triangles. *Microtus xanthognathus* and *chrotorrhinus* have 4 or 5 alternating triangles on M_1 , fewer than the fossil. More importantly, the M^3 of the fossil has a single anteriorly directed loop, both species here considered have 2 such loops ("arms" of Guilday and Bender, op. cit.). *Microtus mexicanus* has an extra anterior trefoil on M_1 (Hall and Cockrum, 1953) which is not present on the fossil.

Comparison with the numerous species of *Microtus* from western North America and Europe was not attempted. The fossils agree so closely with *M. pennsylvanicus*, and are sufficiently distinct from the other microtines that might be present in the area, or with which they might be confused, that further comparison was deemed unnecessary.

In summary, scant, but conclusive, evidence, in the form of a M^3 and a partial mandible with M_1 and M_2 , found in a sinkhole in north central Florida demonstrates the presence of *M. pennsylvanicus* during the Quaternary in Florida, some 300 miles south of the present southern limit of the species.

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